

## PATENT APPLICATION

## IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re application of

Attorney Docket No: Q92006

Francesco CIARDELLI, *et al.*

PCT/IB2004/002098

Appln. No.: None at this time

Confirmation No.: Not yet assigned

Group Art Unit: Not yet assigned

Filed: December 27, 2005

Examiner: Not yet assigned

For: A PROCESS OF CONTROLLED RADICAL GRAFTING OF A POLYOLEFIN

**SUBMISSION OF INTERNATIONAL SEARCH REPORT AND INTERNATIONAL  
PRELIMINARY EXAMINATION REPORT**

Commissioner for Patents  
P.O. Box 1450  
Alexandria, VA 22313-1450

Sir:

Submitted herewith is a copy of the International Search Report or International Preliminary Examination Report received in the International Application corresponding to the above U.S. Application and a PTO/SB/08 A&B (modified) listing the references cited in the Report. Upon issuing the Report, the International Bureau should send a copy of the Report and the cited references to the United States Patent and Trademark Office. However, if the Examiner would like us to obtain and file copies of the references with the USPTO, please contact the office of the undersigned attorney. The Examiner is respectfully requested to acknowledge receipt of the International Search Report or International Preliminary Examination Report.

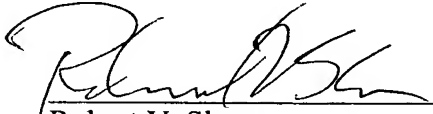
The submission of the listed documents is not intended as an admission that any such document constitutes prior art against the claims of the present application. Applicants do not

Submission of International Search Report  
Attorney Docket Q92006  
December 27, 2005

waive any right to take any action that would be appropriate to antedate or otherwise remove any listed document as a competent reference against the claims of the present application.

The USPTO is directed and authorized to charge all required fees, except for the Issue Fee and the Publication Fee, to Deposit Account No. 19-4880. Please also credit any overpayments to said Deposit Account.

Respectfully submitted,

  
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WASHINGTON OFFICE

23373

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Date: December 27, 2005


# PATENT COOPERATION TREATY

## PCT

### INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY

(Chapter II of the Patent Cooperation Treaty)

(PCT Article 36 and Rule 70)

Applicant's or agent's file reference PC506AG ✓	<b>FOR FURTHER ACTION</b>		See Form PCT/PEA/416
International application No. PCT/IB2004/002098 ✓	International filing date (day/month/year) 24.06.2004 ✓	Priority date (day/month/year) 25.06.2003 ✓	
International Patent Classification (IPC) or national classification and IPC C08F8/00, C08F8/34, C08F8/30, C08F255/02			
Applicant UNIVERSITA' DI PISA et al. ✓			
<p>1. This report is the international preliminary examination report, established by this International Preliminary Examining Authority under Article 35 and transmitted to the applicant according to Article 36.</p> <p>2. This REPORT consists of a total of    sheets, including this cover sheet.</p> <p>3. This report is also accompanied by ANNEXES, comprising:</p> <p>a. <input checked="" type="checkbox"/> sent to the applicant and to the International Bureau) a total of 5 sheets, as follows:</p> <p style="margin-left: 20px;"><input checked="" type="checkbox"/> sheets of the description, claims and/or drawings which have been amended and are the basis of this report and/or sheets containing rectifications authorized by this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions).</p> <p style="margin-left: 20px;"><input type="checkbox"/> sheets which supersede earlier sheets, but which this Authority considers contain an amendment that goes beyond the disclosure in the international application as filed, as indicated in item 4 of Box No. I and the Supplemental Box.</p> <p>b. <input type="checkbox"/> (sent to the International Bureau only) a total of (indicate type and number of electronic carrier(s)) , containing a sequence listing and/or tables related thereto, in computer readable form only, as indicated in the Supplemental Box Relating to Sequence Listing (see Section 802 of the Administrative Instructions).</p>			
<p>4. This report contains indications relating to the following items:</p> <p><input checked="" type="checkbox"/> Box No. I    Basis of the opinion</p> <p><input type="checkbox"/> Box No. II    Priority</p> <p><input type="checkbox"/> Box No. III    Non-establishment of opinion with regard to novelty, inventive step and industrial applicability</p> <p><input type="checkbox"/> Box No. IV    Lack of unity of invention</p> <p><input checked="" type="checkbox"/> Box No. V    Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement</p> <p><input type="checkbox"/> Box No. VI    Certain documents cited</p> <p><input type="checkbox"/> Box No. VII    Certain defects in the international application</p> <p><input type="checkbox"/> Box No. VIII    Certain observations on the international application</p>			
Date of submission of the demand  25.01.2005		Date of completion of this report  08.07.2005	
Name and mailing address of the international preliminary examining authority:  European Patent Office D-80298 Munich Tel. +49 89 2399 - 0 Tx: 523656 epmu d Fax: +49 89 2399 - 4465		Authorized Officer  Wirth, M  Telephone No. +49 89 2399-8595	



**INTERNATIONAL PRELIMINARY REPORT  
ON PATENTABILITY**

International application No.  
PCT/IB2004/002098

**Box No. I Basis of the report**

1. With regard to the **language**, this report is based on the international application in the language in which it was filed, unless otherwise indicated under this item.
  - ☐ This report is based on translations from the original language into the following language , which is the language of a translation furnished for the purposes of:
    - ☐ international search (under Rules 12.3 and 23.1(b))
    - ☐ publication of the international application (under Rule 12.4)
    - ☐ international preliminary examination (under Rules 55.2 and/or 55.3)
2. With regard to the **elements\*** of the international application, this report is based on *(replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to this report):*

**Description, Pages**

1-24 as originally filed ✓

**Claims, Numbers**

1-24 received on 19.04.2005 with letter of 18.04.2005 ✓

- ☐ a sequence listing and/or any related table(s) - see Supplemental Box Relating to Sequence Listing
3. ☐ The amendments have resulted in the cancellation of:
    - ☐ the description, pages
    - ☐ the claims, Nos.
    - ☐ the drawings, sheets/figs
    - ☐ the sequence listing (*specify*):
    - ☐ any table(s) related to sequence listing (*specify*):
  4. ☐ This report has been established as if (some of) the amendments annexed to this report and listed below had not been made, since they have been considered to go beyond the disclosure as filed, as indicated in the Supplemental Box (Rule 70.2(c)).
    - ☐ the description, pages
    - ☐ the claims, Nos.
    - ☐ the drawings, sheets/figs
    - ☐ the sequence listing (*specify*):
    - ☐ any table(s) related to sequence listing (*specify*):

\* If item 4 applies, some or all of these sheets may be marked "superseded."

**INTERNATIONAL PRELIMINARY REPORT  
ON PATENTABILITY**

International application No.  
PCT/IB2004/002098

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**Box No. V Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement**

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**1. Statement**

Novelty (N)	Yes: Claims	1-24
	No: Claims	
Inventive step (IS)	Yes: Claims	1-24
	No: Claims	
Industrial applicability (IA)	Yes: Claims	1-24
	No: Claims	

**2. Citations and explanations (Rule 70.7):**

**see separate sheet**

**Re Item I**

**Basis of the report**

In claim 16, the trade names Irganox were replaced by the corresponding chemical names. This is considered allowable under Art 34(2)b) PCT.

**Re Item V**

**Reasoned statement with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement**

1. The following document is referred to in this communication:  
D1: ROMANI F ET AL: "Monitoring the chemical crosslinking of propylene polymers through rheology" POLYMER, ELSEVIER SCIENCE PUBLISHERS B.V, GB, vol. 43, no. 4, February 2002 (2002-02), pages 1115-1131, XP004312430 ISSN: 0032-3861  
D2: EP-A-1 216 999 (BASELL POLIOLEFINE SPA) 26 June 2002 (2002-06-26)  
D3: US-A-3 301 837 (GIULIANO BARTORELLI ET AL) 31 January 1967 (1967-01-31)  
D4: WONG B ET AL: "Melt rheology of graft modified polypropylene" POLYMER, ELSEVIER SCIENCE PUBLISHERS B.V, GB, vol. 38, no. 11, May 1997 (1997-05), pages 2781-2789, XP004061851 ISSN: 0032-3861
2. D1 discloses a process in which polypropylene is reacted with an initiator and CEFA or BFA which are the preferred "grafting compound" of the present application. D2 and D3 disclose the reaction of polyolefins with unsaturated furanic compounds (claims, examples).

The reaction of an additional unsaturated compound is not disclosed in D1-D3. Present claims 1-24 are therefore novel (Art 33(2) PCT).

The problem to be solved was to avoid the variations in molecular weight of the polymer and to increase the degree of grafting when an unsaturated monomer is

**INTERNATIONAL PRELIMINARY  
REPORT ON PATENTABILITY  
(SEPARATE SHEET)**

International application No.

PCT/IB2004/002098

grafted onto a polyolefin. This problem is solved by the use of the "grafting compound having an electron donator heterocyclic group" (see examples 10-17 of the application).

D1 teaches that in the crosslinking reaction involving radicals, B-cission reactions can be avoided by using appropriate coagents thereby preventing chain degradation. D4 (abstract and second column) points on the fact that the control of B-cission reactions are desirable during the grafting process because they result in a loss of molecular weight. However, neither D1 nor D4 addresses the problem of increase of the degree of grafting. Inventive step is therefore acknowledged (Art 33(3) PCT).